Space Weather Forecast

Issued on Tuesday, 10 January 2023 at 12:02 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely, chance of Strong flares throughout. A possible glancing blow from a CME on the 12th January.

Solar Activity: Solar activity has been High over the past 24 hours, with a Strong flare originating from the sunspot region rotating around the southeast limb. There are six other numbered sunspot regions on the Earth facing disc, the two largest and most complex residing in the southeast and southwest quadrants. A newly emerging and numbered region at the northeast limb, although smaller, produced a mid-class Moderate flare just after midnight UTC. The remaining three spots are all relatively small and have remained largely inactive.

A Moderate flare on 9th Jan from the large region in the southwest did produce a CME, which has been analysed and may give a glancing blow at Earth on day 3 (12th Jan), although this is a low probability. No other Earth-directed CMEs are in the forecast.

Solar Wind / Geomagnetic Activity: Solar winds have been at slow levels through the period. Total Interplanetary Magnetic Field was weak, while the north-south component also varied weakly. Geomagnetic activity was Quiet (Kp 0-2) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms occurring, although there was a small, short enhancement observed just after midnight UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with a chance of becoming High from any Strong flares through the forecast period, these most likely from the two largest regions on the disc, the region in the southeast quadrant, or the region which is currently emerging around the northeast limb.

Solar Wind / Geomagnetic Activity: The Moderate flare from the sunspot region in the southwest did produce a CME early on the 9th, which may give a glancing blow at Earth on day 3 (12 Jan), although this is a low probability. No other Earth-directed CMEs are in the forecast.

Solar wind speeds are now at background levels. However, a coronal hole is likely to bring a fast wind on Day 1 (10th Jan). Geomagnetic activity is expected to be mostly Quiet at first, increasing with the arrival of a fast wind on Day 1 (10th Jan) to become Unsettled to Active, with a slight chance of a G1/Minor Storm. Activity then slowly declining through by Day 2 (11th Jan) and possibly Day 3 (12th Jan), although there is the slight chance of a glancing blow from the CME on the 9th Jan, which may increase geomagnetic activity, potentially lasting into Day 4 (13th Jan), before activity gradually declines.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a risk of an increase should

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any significant flares occur, giving a slight chance of exceeding the S1/Minor Storm threshold.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	Yes	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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